

**IN THE CLAIMS**

A listing of all claims and their current status in accordance with 37 C.F.R. § 1.121(c) is provided below.

1. (currently amended) A method of monitoring a polyolefin production process, comprising:

placing a spectroscopic probe of a low-resolution Raman spectroscopic system into a conduit of a polyolefin production system, ~~having the~~ conduit contents ~~that comprise~~ comprising at least one of a feedstock, a feed stream, a reactor discharge, a recovered component, a purified component, a polymer fluff, an extruder feed, ~~and~~ or a polymer pellet stream;

exposing the conduit contents to a radiation emission from the spectroscopic probe;

acquiring a spectroscopic signal in substantially real-time from the conduit contents in response to the radiation emission via the spectroscopic probe;

analyzing the spectroscopic signal to determine at least one property of interest of a component of the conduit contents.

2. (cancelled)

3. (original) The method as recited in claim 1, wherein the feedstock comprises at least one olefin monomer.

4. (currently amended) The method as recited in claim 1, wherein the feed stream comprises at least one of an olefin monomer, a comonomer, a chain transfer agent, a diluent, a catalyst, a co-catalyst, ~~and~~ or an additive, or any combination thereof.
  
5. (currently amended) The method as recited in claim 1, wherein the reactor discharge comprises ~~at least one of~~ the polymer fluff, an olefin monomer, a comonomer, a catalyst, ~~and~~ or a diluent, or any combination thereof.
  
6. (currently amended) The method as recited in claim 1, wherein at least one of the recovered component and the purified component comprise ~~at least one of~~ an olefin monomer, a comonomer, a catalyst, ~~and~~ or a diluent, or any combination thereof.
  
7. (original) The method as recited in claim 1, wherein the polymer fluff comprises a polymer fluff blend.
  
8. (original) The method as recited in claim 1, wherein the polymer pellet stream comprises a mixture of polymer pellets.
  
9. (currently amended) The method as recited in claim 1, wherein the extruder feed comprises at least one of the polymer fluff, an additive, ~~and~~ or a peroxide, or any combination thereof.

10. (original) The method as recited in claim 1, wherein the property of interest comprises a chemical concentration of the component.

11. (currently amended) The method as recited in claim 1, wherein analyzing the spectroscopic signal comprises analyzing the spectroscopic signal using one or more chemometric models and the property of interest comprises a percent solids, a mechanical property, a chemical property, a rheological property, ~~and~~ or a thermal property of the component, ~~or any combination thereof.~~

12. (Original) The method as recited in claim 1, further comprising adjusting the composition of the conduit contents in response to the property of interest.

13. (currently amended) The method as recited in claim 1, further comprising adjusting the operation of ~~at least one of~~ a reactor feed system, a polymerization reactor system, a monomer recovery system, an extruder feed system, and ~~and~~ or an extruder pelletizer, or any combination thereof, in response to the property of interest.

14. (original) The method as recited in claim 1, further comprising adjusting a product shipment in response to the property of interest.

15. – 28. (cancelled)

29. (currently amended) A polyolefin production system, comprising:  
a reactor feed system configured to receive one or more feedstocks via a first set of conduits and to output one or more feedstreams via a second set of conduits;  
a polymerization reactor system configured to receive the one or more feedstreams via the second set of conduits and to output a reactor discharge via a third set of conduits;  
a monomer recovery system configured to receive the reactor discharge via the third set of conduits and to output one or more recovered components via a fourth set of conduits and a polymer fluff via a fifth set of conduits; and  
one or more spectroscopic probes of one or more low-resolution Raman spectroscopy systems situated in at least one of the first, second, third, and fourth set conduits configured to acquire a spectroscopic signal in substantially real time.
30. (cancelled)
31. (original) The polyolefin production system as recited in claim 29, wherein the one or more feedstocks comprise at least one olefin monomer.
32. (currently amended) The polyolefin production system as recited in claim 29, wherein the one or more feedstreams comprise ~~at least one of~~ an olefin monomer, a comonomer, a chain transfer agent, a diluent, a catalyst, a co-catalyst, ~~and~~ or an additive, or any combination thereof.

33. (currently amended) The polyolefin production system as recited in claim 29, wherein the reactor discharge comprises ~~at least one of~~ the polymer fluff, an olefin monomer, a comonomer, a catalyst, ~~and~~ or a diluent, or any combination thereof.

34. (currently amended) The polyolefin production system as recited in claim 29, wherein the one or more recovered components comprise at least one of an olefin monomer, a comonomer, a catalyst, ~~and~~ or a diluent, or any combination thereof.

35. (original) The polyolefin production system as recited in claim 29, wherein the polymer fluff comprises a polymer fluff blend.

36. (new) A method of monitoring a polyolefin production process, comprising:  
placing a Raman spectroscopic probe into a conduit of a monomer recovery system of a  
polyolefin production system;  
exposing contents of the conduit or vessel to a radiation emission from the spectroscopic  
probe;  
acquiring a spectroscopic signal in substantially real-time from the contents in response to  
the radiation emission via the Raman spectroscopic probe;  
analyzing the Raman spectroscopic signal to determine at least one property of interest of  
a component of the conduit contents.

37. (new) The method of claim 36, wherein the conduit contents comprise ethylene, diluent, and 1-hexene.

38. (new) The method of claim 37, wherein the component comprises ethylene and the at least one property of interest comprises a concentration of the ethylene in the conduit contents.

39. (new) The method of claim 36, wherein the conduit is coupled to an overhead discharge of a flash vessel in the monomer recovery system.

40. (new) The method as recited in claim 1, wherein the feed stream comprises an olefin monomer and the property of interest comprises a concentration of a catalyst poison in the feed stream.

41. (new) The method as recited in claim 1, wherein the feed stream comprises ethylene and 1-hexene, and the property of interest comprises a concentration of the 1-hexene in the feed stream.

42. (new) The method as recited in claim 1, wherein the feed stream comprises a catalyst.

43. (new) The polyolefin production system as recited in claim 29, wherein the polymerization reactor system comprises a loop reactor.